An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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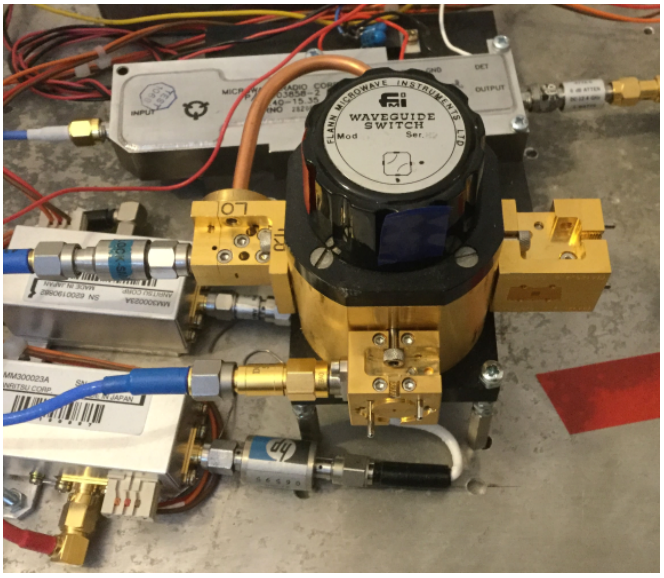
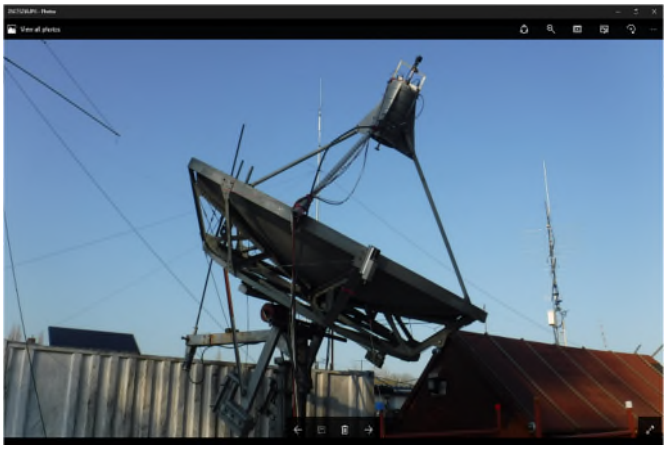


122 / 241GHz Transverter



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Loan Equipment

Don't forget, UKuG has loan kit in the form of portable transceivers available to members for use on the following bands:

5. 7GHz 10GHz 24GHz 76GHz

Contact John G4BAO for more information.

Subscription Information

The following subscription rates apply

UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership**. For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via

https://groups.io/g/Scatterpoint and/or Dropbox. Also, **free access to the Chip Bank**

Please make sure that you pay the stated amounts when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

You will have to make a quick check with the membership secretary if you have forgotten the renewal date. Please try to renew in good time so that continuity of newsletter issues is maintained. Put a **renewal date reminder** somewhere prominent in your shack.

Please also note the payment methods and be meticulous with PayPal and cheque details.

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

or a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary (or, as a last resort, by cash sent to the Treasurer!)

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome.

Please send them to

editor@microwavers.org

The CLOSING date is

the FIRST day of the month

if you want your material to be published in the next issue.

Please submit your articles in any of the following formats:

Text: txt, rtf, rtfd, doc, docx, odt, Pages

Spreadsheets: Excel, OpenOfÞce, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

I can extract text and pictures from pdf files but tables can be a bit of a problem so please send these as separate files in one of the above formats.

Thank you for you co-operation.

Roger G8CUB

Reproducing articles from Scatterpoint

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You may not reproduce articles for profit or other commercial purpose. You may not publish Scatterpoint on a website or other document server.

UKµG Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UKuG has a considerable pool of knowledge and experience available, and now we can financially support worthy projects to a modest degree.

Note that this is essentially a small scale grant scheme, based on 'cash-on-results'. We are unable to provide ongoing financial support for running costs – it is important that such issues are understood at the early stages along with site clearances/licensing, etc.

The application form has a number of guidance tips on it – or just ask us if in doubt! In summary:-

- Please apply in advance of your project
- We effectively reimburse costs - cash on results (eg Beacon on air)
- We regret we are unable to support running costs

Application forms below should be submitted to the UKuG Secretary, after which they are reviewed/ agreed by the committee

www.microwavers.org/proj-support.htm

UKµG Technical support

One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, what is more important, test equipment. Our friends in America refer to such amateurs as “Elmers” but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let’s call them Tech Support volunteers.

While this is described as a “service to members” it is not a “right of membership!”

Please understand that you, as a user of this service, must expect to fit in with the timetable and lives of the volunteers. Without a doubt, the best way to make people withdraw the service is to hassle them and complain if they cannot fit in with YOUR timetable!

Please remember that a service like our support people can provide would cost lots of money per hour professionally and it’s costing you nothing and will probably include tea and biscuits!

If anyone would like to step forward and volunteer, especially in the regions where we have no representative, please email john@g4bao.com

The current list is available at

www.microwavers.org/tech-support.htm

UKµG Chip Bank – A free service for members

By Mike Scott, G3LYP

Non-members can join the UKµG by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of components on the site will not be a guarantee of availability of that component.

The service is run as a free benefit to all members of the UK Microwave Group. The service may be withdrawn at the discretion of the committee if abused. Such as reselling of components.

There is an order form on the website with an address label which will make processing the orders slightly easier.

Minimum quantity of small components is 10.

These will be sent out in a small jiffy back using a second class large letter stamp. The group is currently covering this cost.

As many components are from unknown sources. It is suggested values are checked before they are used in construction. The UKµG can have no responsibility in this respect.

The catalogue is on the UKµG web site at
www. microwavers. org/chipbank. htm

Obituary
Mike Walters, G3JVL

Mike Walters, G3JVL, sadly passed away on 17 May 2019, aged 81.

He was a Senior Engineer with Plessey for many years, then latterly he set up his own business, JVL Electronics, where he continued his work with antennas and produced miniature transmitters and receivers for various commercial businesses before retirement in 2007.

First licenced in 1954, Mike's initial radio interest was in HF. He then moved up to 4m and experimented with Sporadic E and other propagation modes. G3JVL helped to set up ZB2VHF in conjunction with G3PLX, and in the early 70s constructed the Iceland beacon TF3VHF and made the first G-TF contact (with TF3EA) on 4m. Mike continued up in frequency, and began exploring the VHF/UHF bands.

Always keen on designing and optimising antennas, Mike produced a number of high gain Loop Yagi designs. His first was for 1.3GHz, but versions then followed for 432MHz, 2.3, 3.4 and even 10GHz! He promoted the Alford Slot and slotted waveguide omni antennas , which are in use today at many microwave beacons.

In the mid 70s G3JVL became interested in 10GHz. He promoted the 'balloon board' as a highly stable crystal source, which together with his innovative transverter was the foundation of early 10GHz narrowband systems and as a result narrowband activity blossomed.

Mike had a very positive, can-do, attitude, and provided help and encouragement to many people in their early days on microwaves. He provided the community with technical advice, practical designs and often helped with key components too. Many of us started out on 10GHz with JVL Narrowband transverters - these gave out 1mW using low loss waveguide filters with a passive mixer. He had a keen interest in waveguide filters, and even built one for GB3HV on 1.3GHz - it was about 3ft long, with 3 cavities!

His regular nightly sked with G3YGF over the Hayling Island-Oxford path, using a novel 'flyswatter' antenna, gained an improved understanding of troposcatter and discovered rainscatter propagation. The frequent propagation enhancements of rain scatter changed 10GHz from a portable-only to a home station band.. His powerful equipment (up to 100W if needed!) enabled many home station to home station QSOs all over the UK and beyond.

Mike was a member of the RSGB Microwave Committee for many years, and co-authored the Microwave Manual. We have lost a true pioneer in Mike. His many friends will remember him for a long time.

The picture shows him in 1979, having just fitted a 4ft dish to G3YGF's landrover, with his flyswatter in the background.

From Neil G4LDR

Yesterday I attended the funeral of Mike G3JVL at Hayling Island.

At the funeral Charlie Suckling, G3WDG, spoke about Mike's amateur radio achievements including the development of G3JVL quad loop antenna and the G3JVL transmit/receive diode mixer which allowed many to have their first ssb contacts on 3cm. Recordings were also played of some early CW and SSB contacts Mike had during the 1980s on 3cm.

At the request of Mike's family all the tributes that had been sent in, including all those posted on this reflector, were read out.

A cautionary note from a UK Microwave Group member.

On Wednesday this week I had a visit from local council planning officers, concerning a query from a member of the public of a possible 'unauthorised dish'. This refers to my 1.2m prime focus dish currently aimed at Eshail 2. Their enquiries were not limited to the dish of course and all of my various amateur radio antennas came under scrutiny. Subsequent to this, I have received a letter requesting that Planning Permission be applied-for or all antennas or these be removed, which amounts to the dish and all my other amateur radio antennas including HF, VHF and UHF.

The RSGB planning advice leaflet provides some help dealing with this situation, which I shall now have to devote time-to. However, the upshot to any member is this: do not let any dish installation endanger your amateur radio interest in general!

A 52 MHz to 13.6 GHz Signal Generator Based on the ADF5355

Brian Flynn GM8BJF

Introduction.

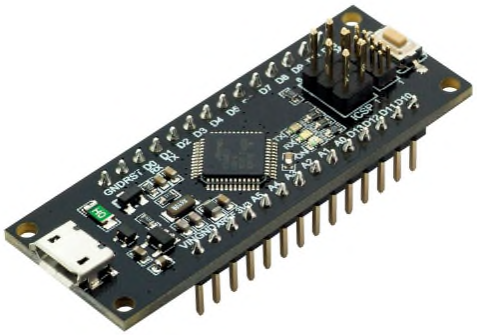
The ADF 5355 is a versatile fractional N synthesiser that covers the frequency range 54 MHz to 13.6 Ghz . It uses and on-chip VCO arrangement and is capable of milliHertz frequency resolution at 13 GHz. They are readily available from Chinese vendors on the usual auction sites incorporated into basic development boards. The cost of these boards is comparable with the cost of the chips in one off quantities. For some time I thought that a useful signal generator could be produced based on one of these boards.

In the past I have used them for low powered personal beacons and as local oscillators and signal sources all programmed with Arduinos. Recently I came across the Arduino based signal generator design by Christian Petersen DD7LP based on the ADF4351 [1] and I used his Arduino "sketch" as the starting point for my project. The ADF5355 is capable of operating with frequency steps of milliHertz at 13 GHz, and to have the required arithmetic precision for one Hertz resolution was going to be beyond the capabilities of an 8-bit Arduino ATmega328P. It also has a more complex register structure than the ADF4351. Fortunately there are a number of much more powerful processors supported in the Arduino IDE which are well provided with libraries and example code.

The ADF5355 gets its very high frequency resolution by two fractional parts to programme its frequency. To have resolutions of the order of Hertz the micro controller must be capable of calculations with around 12 decimal digits which implies a 32 bit controller using double precision arithmetic is required. Details of the register programming are in the datasheet [2].

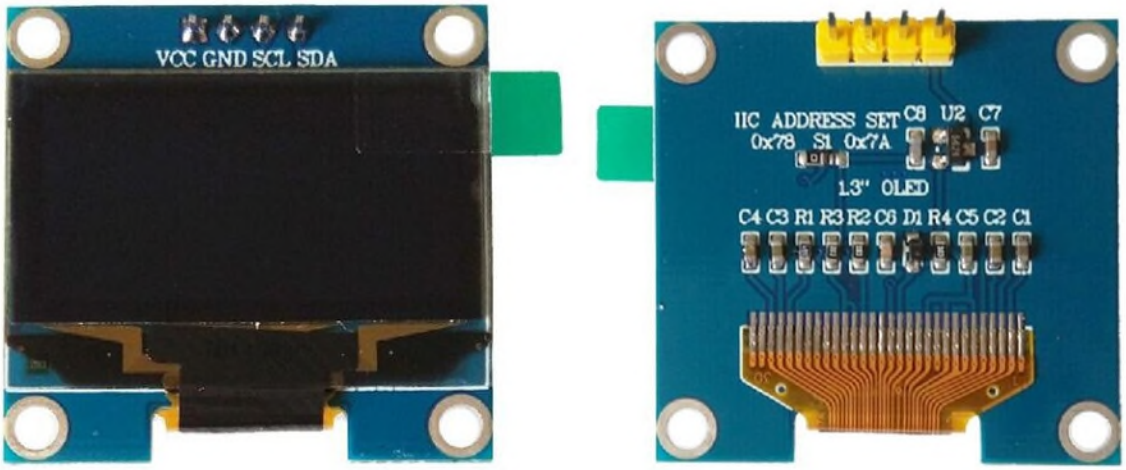
Microcontroller

One suitable 32 bit Microcontroller is the WeMOS SAMD21 ARM Cortex M0 which runs at a 48 MHz clock rate. It is supported in the Arduino IDE and if programmed appropriately is capable of the necessary arithmetic precision. It is also available mounted on a pcb with a USB programming interface in the well established Arduino hardware format. Ref [3]. Other options supported by the Arduino IDE would be some of the Maple Leaf boards using ST Microelectronics STM32 chips.



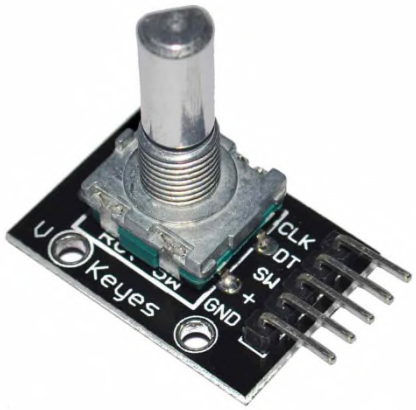
Display

For this project I choose a SSD1306 1.3 inch OLED display. These are available in either I2C or SPI versions. The 0.96 inch variant is more common but requires good eyesight!. I sourced the 1.3 inch mounting PCB and the 1.3 inch display separately and assembled my own. Although the display is small it gives a very sharp image. Ref [4] and [5]. I opted for the I2C bus for the display to keep it separate from the SPI bus controlling the ADF5355. I thought this wise to minimise noise transmission to the synthesiser. For a typical schematic of the of the OLED display module see [6].



Rotary encoders

To set the frequency and tuning step size Keyes type push button rotary encoders were used. These are widely available from the usual internet sources.

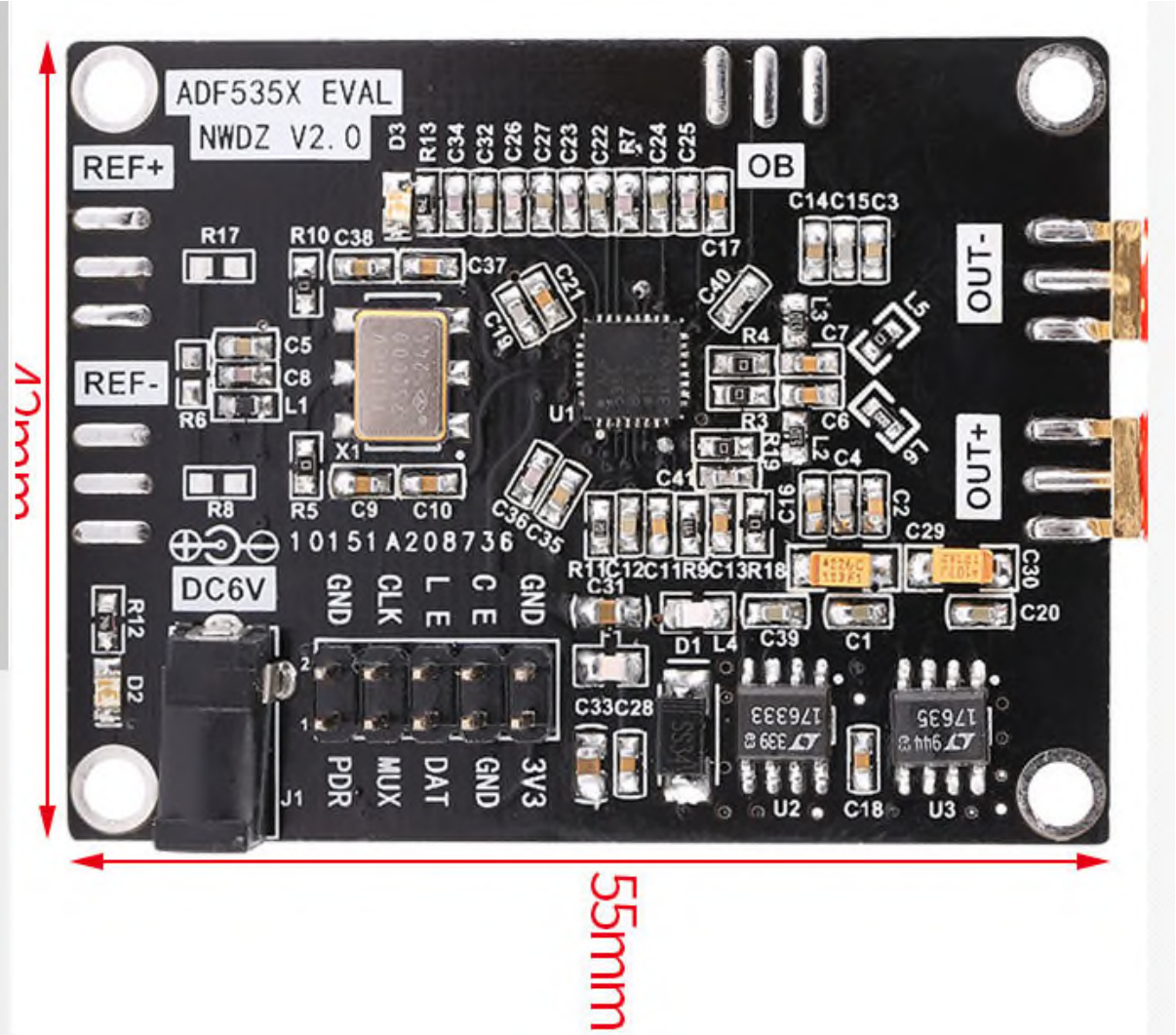


Two encoders were used, one as the main tuning control and the other to select the step size. The push button functions were used to select preset frequencies in each of the amateur VHF/microwave bands and to set the output power level.

ADF5355 Module

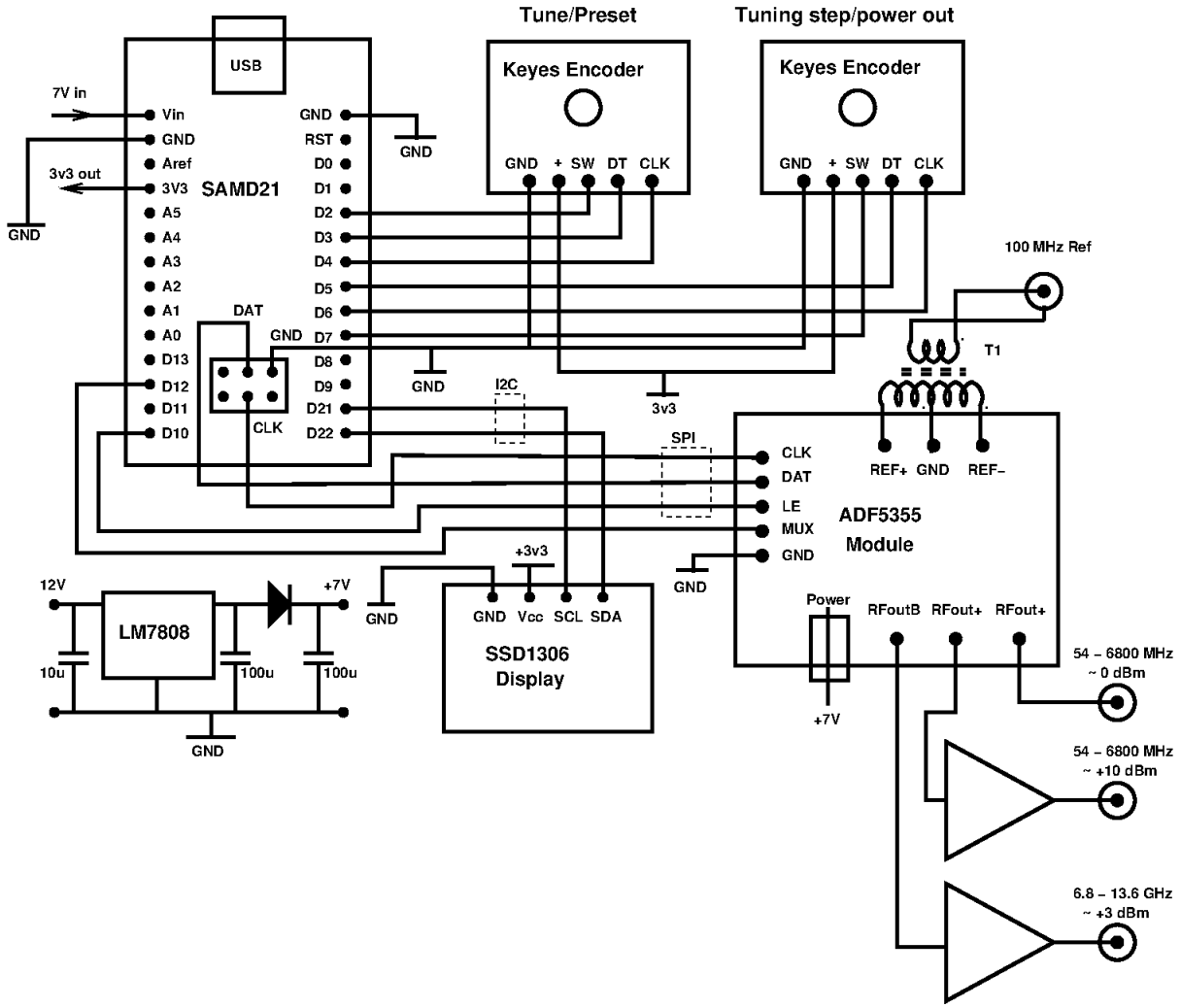
The module I used is shown below. It used a 125 MHz reference oscillator with a push-pull output as that is claimed to improve the phase noise (PN) performance. For this application I used an external 100 MHz ovened reference for better frequency stability and accuracy. To provide a push-pull reference input to the board I supplied the reference via a small trifilar wound bulun transformer constructed using a double hole ferrite, connected to the REF+ and REF- inputs. To disable the onboard reference and connect the external one I had to

unsolder L1 and populate R17 and R8 with 100pF capacitors. The schematic is available in the references at the end [7].



The ADF5355 gets its very high frequency resolution by using two fractional parts along with a programmable second modulus to set its frequency, (The first modulus is fixed in hardware). Frac1 is a 24 bit number and Frac2 is a 14 bit number. A good description of the process used to calculate the two fractional parts and the second modulus is given by Andy Talbot G4JNT in [8]. The Programme calculates these values from the frequency dialled into the OLED display and loads them into the appropriate registers. To have resolutions of the order of Hertz the micro controller must be capable of eleven decimal digits. The SAMD21 is a 32 bit device so when used with double precision arithmetic it is up to the job.

Overall schematic



Arduino code.

The code is available from Github as detailed below. To compile the code and upload it to a SAMD21 board start the IDE running and in the Tools menu select “Arduino/Genuino Zero (Native USB Port)” as the board. It may be necessary to install the software for this if it is not already there. To do this go to Tools > Board > Boards Manager and select “Arduino SAMD21 Boards (32 bits ARM Cortex-M0+)” to install support for the board. The signal generator code can be downloaded from here on Github, [9].

Completed Unit

Conclusions

The outcome of this project is a signal generator with continuous coverage between 52 MHz and 13.6 GHz in 10 Hz steps. The step size can be changed in decades from 10 Hz to 1000 MHz. The display is an I2C OLED device which gives a bright well defined image. By adding amplifiers after the outputs from the chip the output power is boosted to useful levels for testing purposes. In terms of phase noise and spurious signal output it is not a match high end professional units but it sure beats then on cost, size and weight!

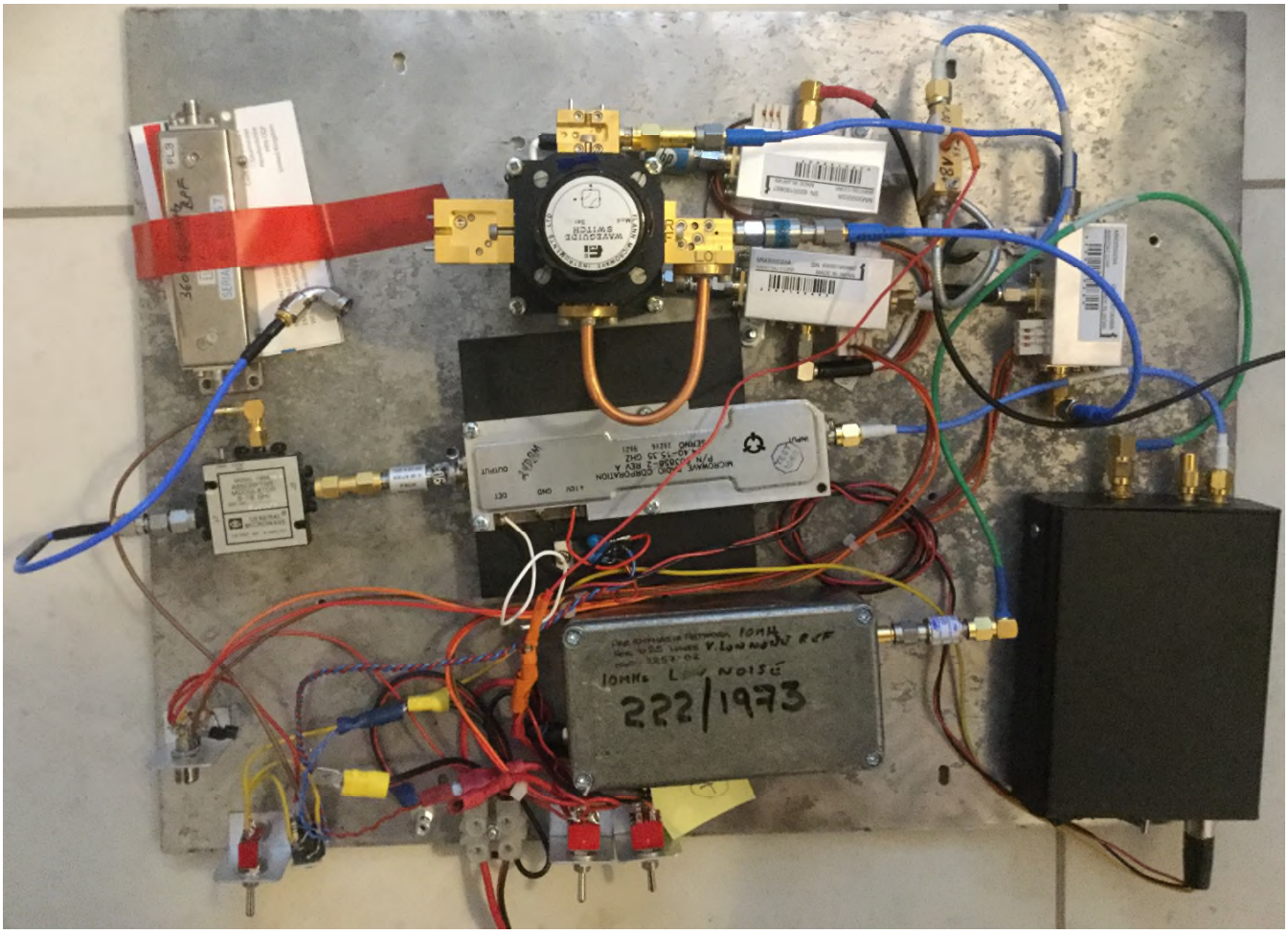
References:

1. http://www.darc-husum.de/Frequenzsynthesizer.html
2. https://www.analog.com/media/en/technical-documentation/data-sheets/ADF5355.pdf
3. https://www.ebay.co.uk/itm/NEW-WeMos-D1-USB-SAMD21-M0-Mini-ARM-Cortex-M0-32-Bit-extension-For-UNO-Arduino/192669490902?hash=item2cdbff1ed6:g:vUwAAOSwbehbqcTe
4. https://www.aliexpress.com/item/1-3-inch-30P-White-Blue-SPI-OLED-Screen-SSD1306-Drive-IC-128-64-Parallel-I2C/32813434220.html?spm=a2g0s.9042311.0.0.17f54c4dBcL1BS
5. https://www.aliexpress.com/item/SPI-IIC-Adapter-Board-for-1-3-inch-OLED-Screen-2-8-5-5V/32248690998.html?spm=a2g0s.9042311.0.0.17f54c4dBcL1BS
6. http://wiki.sunfounder.cc/index.php?title=OLED-SSD1306_Module
7. http://gm8bjf.joomla.com/images/pdf/ADF5355_sch.pdf
8. http://www.g4jnt.com/ADF5355_Synthesizer_Control.pdf
9. https://github.com/gm8bjf/ADF5355_sig_gen

241 GHz Transverters

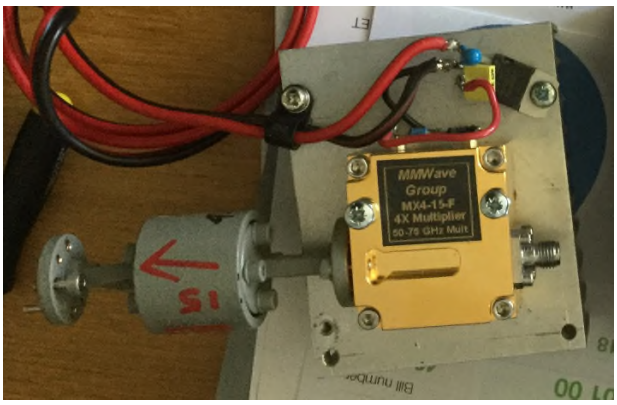
Roger G8CUB

Some details of the Transverters used for the cross Thames QSOs

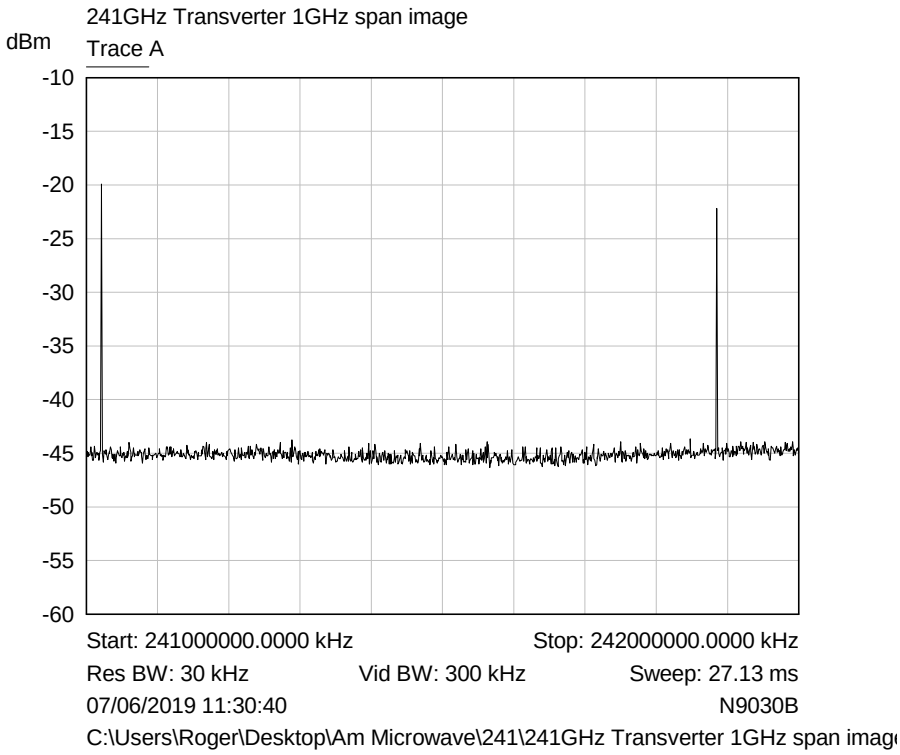


241GHz Transverter with 432.8MHz IF.

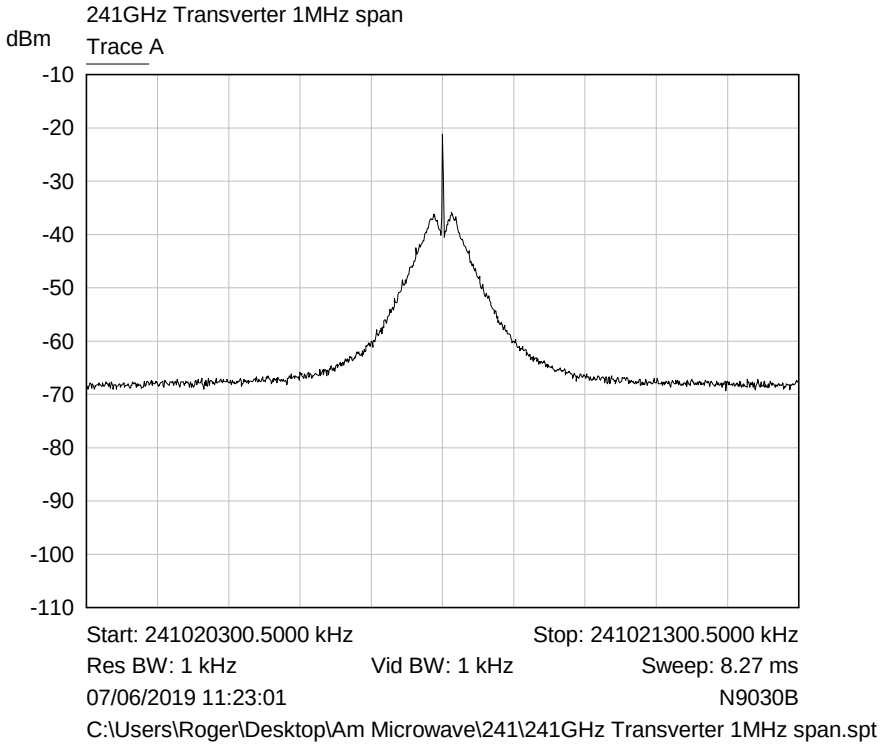
I didn't say it was pretty… This is basically a 122GHz Transverter, with a mixer in front. Black box on the left contains the ZL14G synth. The grey 222/1973 is the 10MHz reference. Times 4 multiplier on the heatsink. The 15 /61GHz multiplier is shown below. On the left of the WG switch is the 61/122 doubler. To the right is the 122G mixer, and to the top the 241GHz mixer. For 241 the wg switch stays in one position. Both mixers have dc isolators fitted. The relays are IF switching (tx/rx & 122/241).



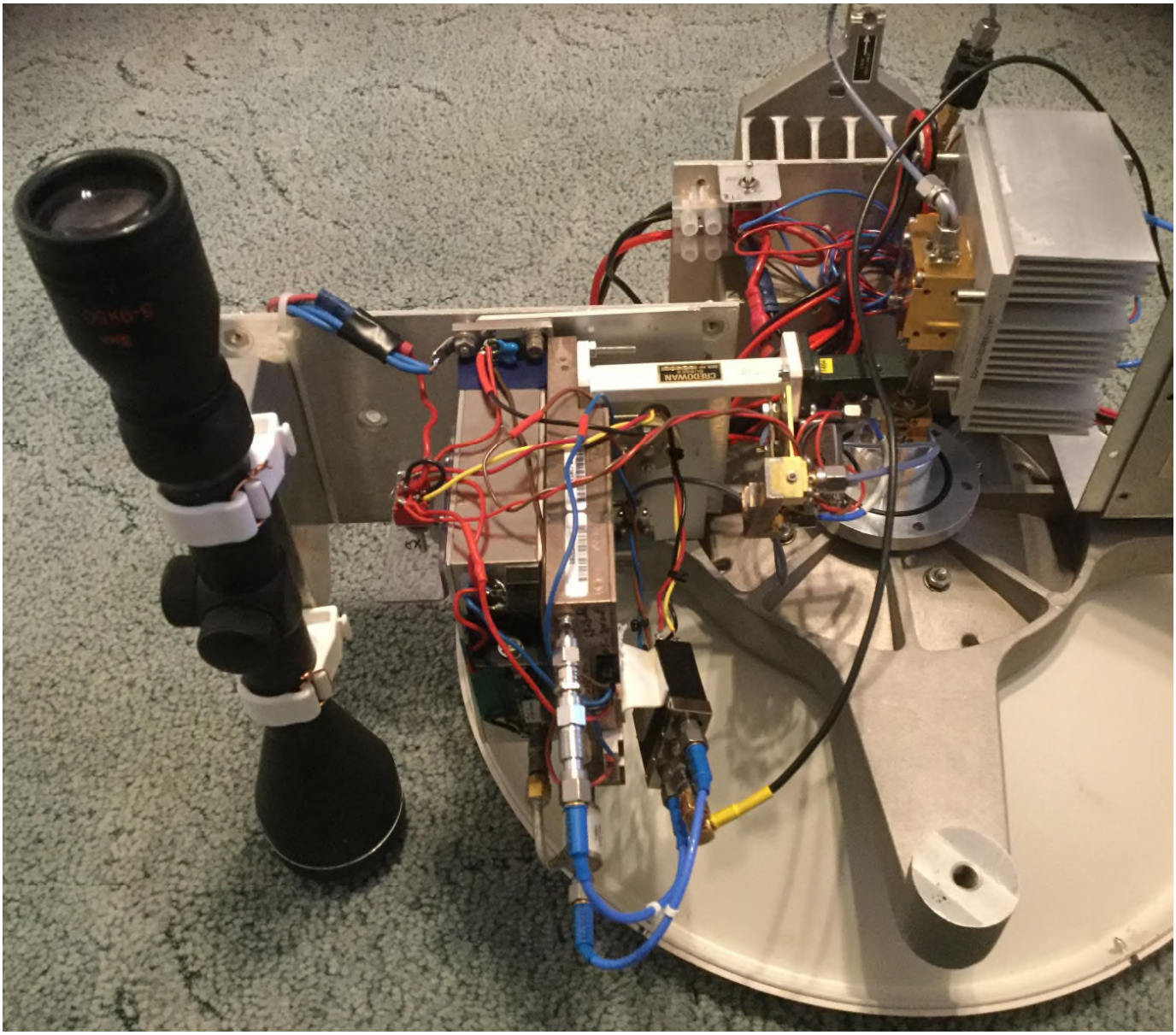
50 – 75GHz Active x4 multiplier with isolator



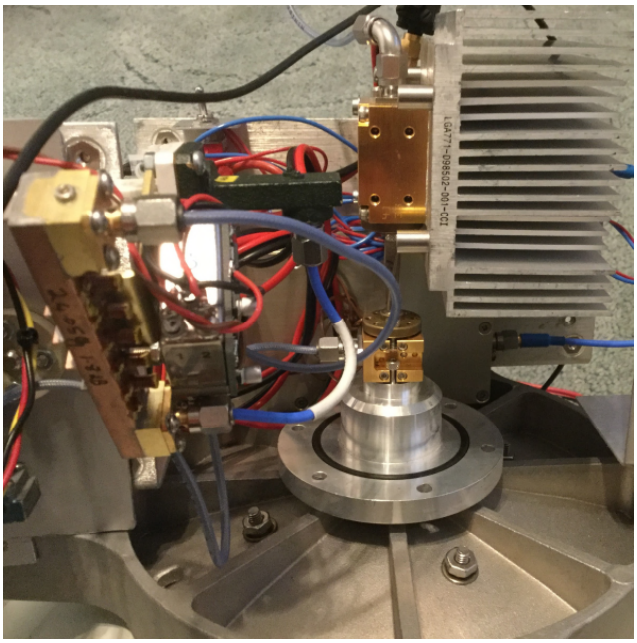
Wanted signal 241.020GHz on the left, image 241.885GHz on the right. There is no sign of LO x2 with this sub-harmonic mixer. By using LO high the image is kept within the band.



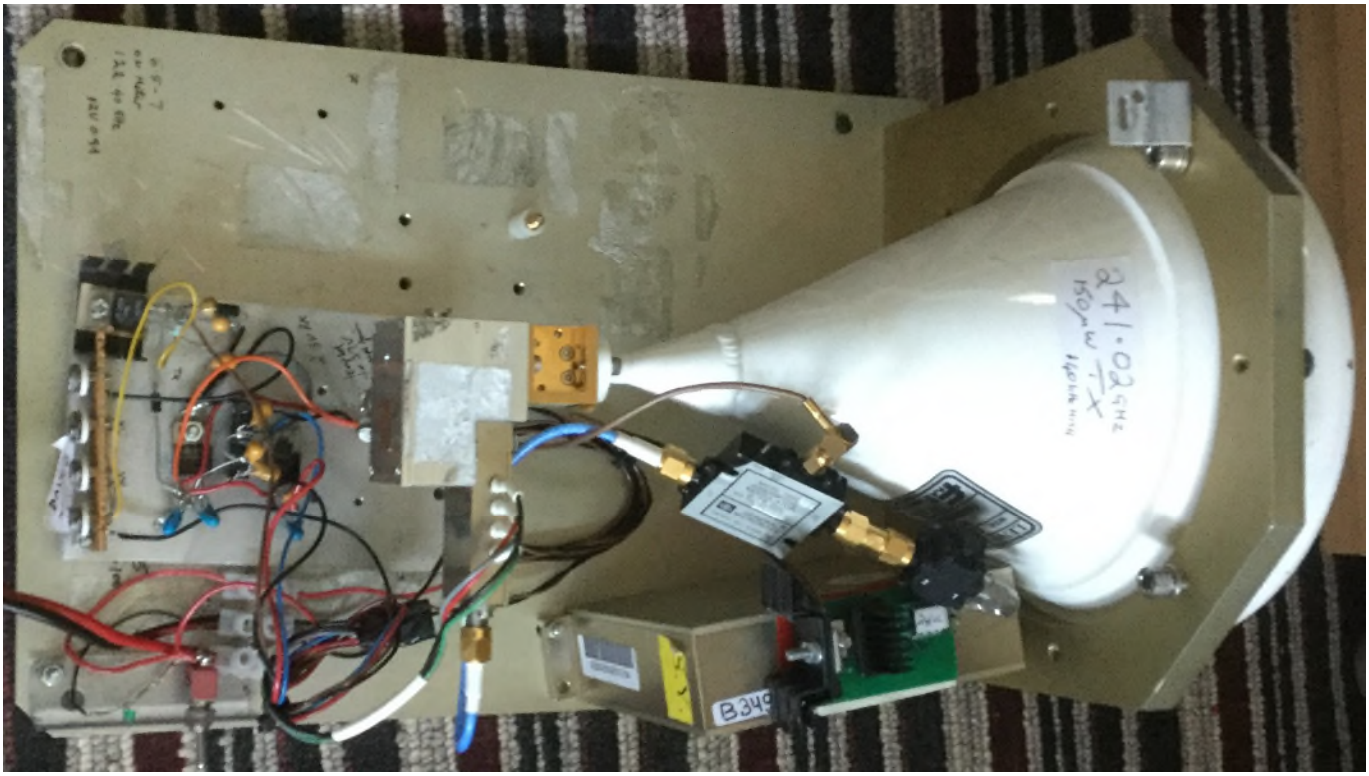
The huge x64 multiplication means that the ZL synth noise is very evident. Close to the carrier the low noise reference is doing its job. Even if the multipliers were perfect, the noise from the 10MHz reference would be increased 87.6dB (20x log24100).



241 transverter with 24G IF.



Mixer bolted directly on to the dish. LO at 108G via wr-10 twist


241G CW beacon. 40/80 doubler in aluminium block. Elcom synth via isolator and pin switch for keying.

The 241GHz transverter with 432MHz IF, is an addition to my 122GHz (and potential 134GHz) transverter.
The 122G system uses a fundamental mixer, with the LO being used on TX as a CW source.
For 241, the waveguide switch is left in the TX position. The output then being the LO for the sub-harmonic 241 mixer, with a LO level of approximately 12mW.
The synthesiser frequency is set to be LO high giving a 432.8MHz IF. The synthesiser being a ZL14G from Wayne ZL2BKC. The output at 3.7727GHz goes into a x4 multiplier, giving just over 15GHz out. This is then followed by a x4 active multiplier to 61GHz, and then a x2 passive doubler to 121GHz.
The critical requirement for a millimetre LO with high multiplication, is low phase noise. The 10MHz reference used is from Wenzel, and was stripped from an Ebay purchased phase noise test set. The spec for the one used is -160dBm/Hz @ 100Hz, -140dBm/Hz @ 10Hz. Wenzel will happily supply replacements at $2700 each!
One important thing that I have found, is to use an isolator between the x4 and final x2 multiplier.

The second system is similar to the above, but uses a 108.486GHz LO, and a 24GHz IF. This came about as I had destroyed the first mixer with static. Having bought a replacement, I then managed to get the first one repaired, thus leaving me with two mixers. The mixer spec. is 210 - 230G, with IF 1 - 10G. Thus in the usual Amateur way, I am pushing the limits of its performance. The spec is 8dB conversion loss, which is a huge improvement on the 50dB or so, of my first mixer! The LO is a similar ZL14G synthesiser on 4.5025GHz with x4 multiplier, then a x6active multiplier to 108GHz. LO level is about 12mW. Phase (i.e. match) was found to be important into that final multiplier. This was adjusted to give best conversion loss. As with other mm transverters, I found that input match, probably affecting output match to be critical. Despite the LO level not changing significantly, the cable length was very important. Waveguide WR3.5 on the Teratech mixers, provide high-pass filtering.

The 24G transverter is an Eyal Gal module with Elcom synths. This is my small portable unit, usually fitted with 20dB horns. In this case I added some extra TX filtering (as it was being used at low level), and a change over relay. A waveguide attenuator reduces power to 2mW.

Both transverters use 30cm Cassegrain dishes, of different types. An E-band antenna on the 24G IF unit, and a 122GHz dish on the other.

An advantage of using LO high on one transverter and LO low on the other, is that one uses LSB, the other USB. In addition to the IF offset, it ensures that any QSO is not being made at IF. Plus making the image in-band on the 432MHz IF unit.

The separate CW beacon used an Elcom synth on 13.390GHz.

It uses a 40G x 3 multiplier (CMA382400), with around 150mW. This drives a MA46H146 diode to around 8mW at approx. 80G. I have found that these varactors work well as doublers, but are more difficult to use as higher order multipliers. Probably as it is difficult to get the required idlers correct. This in turn drives a Teratech x3 multiplier, with 140 - 150uW output at 241.02GHz.
The beacon source uses a Flann 80G horn, which appears to work well at three times frequency. High pass filtering is provided by the wr-3.5 output waveguide on the tripler, removing any 160G product.

Updates

HDL_ANT now runs on Win10 according to the U/S reflector

from: Paul Wade W1GHZ
I still get requests to update my HDL_ANT antenna software so it will run on Windows 10 (and 7).
I have tried several times, but finally got it going.

If you find the program useful, please download from:
http://w1ghz.org/software/HDL_ANT32_V4.exe

Please let me know if you find any problems.
Suggestions for improvements also welcome, but no promises.

I also updated my attenuator calculator program:
http://w1ghz.org/QEX/QEXPAD32.zip

73
Paul

Editors Comments

Here is where you can have details of your projects published. Just send them in to the editor – please…..

Roger G8CUB

Activity News: May 2019

By John G4BAO

Please send your activity news to: scatterpoint@microwavers.org

Introduction

A first report from the new activity news editor John G4BAO. Please give him a further welcome by sending in lots of activity reports.

cm-bands

6cm CW EME activity During the Dubus contest

Peter G3LTF (50W 6m dish) missed most of the first pass because of strong winds here but when he did get on at about 20:30 he enjoyed his first 6cm "pile up" ending the day with 12 worked. Peter had hoped to get some JAs in the log on the second pass but by the time the moon had cleared trees, at 13:30, they seemed to have all closed down. He worked another 12 stations during the day including TM1MOON the Moon landing commemoration station (see QRZ.com). Activity seemed a bit down on previous years and libration spreading was very strong at times.
John G4BAO was also QRV with his small system, (25W to a 1.9m dish), but struggled to work Karl DF3RU, and no one else despite some reasonable signals from the big stations, notably SA6BUN, HB9Q and ES5PC. All of whom would have been workable using JT4F had it not been a CW /SSB contest. At Perigee (closest Moon distance) a couple of days before the contest, John was seeing echoes on his JT waterfall display the waterfall and some moon noise but over the weekend, nothing. Despite seeing 8-9 dB of Sun /cold sky (normal) and 25W at the feed no moon noise or echoes. In an exchange with G3LTF, Peter observed "Your comments about signal levels align with my feelings, everything (sun noise/ moon noise) seemed normal but signals at times seemed somewhat below normal." He went on to consider some of the issues about the "science" of 6cm EME. The problem seems to be that when trying to model EME path loss, we may not have all the system variables tied down to the level where one can be scientifically definitive. He doesn't believe it was the change in Moon distance and the weather effects are not big enough.

From Neil G4DBN

Neil G4DBN (IO93) monitors all 10GHz UK/EU beacons and the WebSDRs at Mow Cop, Farnham and PI2EHV-2 on most days with his 95cm dish on a SCAM12 (wind permitting). Neil worked DF0MU (JO32, 576km) on 10GHz on 4th May and 1st June, and heard DB0GHZ from Helgoland (JO34, 577km) on 23rd May and 1st June. In the four weeks to June 9th, Neil heard GB3KBQ on 10GHz (IO80, 342km) on nine days out of 12 attempts via tropo, R/S or A/S.
Neil has also been working with G8DMU to increase the number of GHz bands which Tony can operate portable from his van. Tony bought two of the C band scalar chokes available from many web suppliers.
Neil machined and TIG welded a 68.5mm OD feed with an N socket and probe and trimmed it to around 30dB return loss, then set up an antenna range to check the edge taper, adjusting the scalar to get -10dB at the dish edge. It seems to perform well, Tony worked G3LDR at 330km in the May UKAC.

From John G4BAO

The 10th and 11th of June saw some very wet weather over the UK enabling me to have a couple of late evening QSOs on 10GHz rainscatter with G3UVR IO83KH (km) CW 55S/55S and G4DBN IO93NR (km) SSB57/57. Other than that and a 5760MHz EME CW QSO with DF3RU I've been busy on other no-radio things so my logbook for May is fairly empty.

From John G0API

After a near 25 year break the Flight Refuelling ARS in IO90 have nearly finished a full refurb of their 3.4m, 10GHz ,system last used in earnest on EME in 1994 .

The dish is fully auto tracked using in house developed software to interface NEC Selsyns and is now finger-tip to start and forget (it even works via mobile phone) .Drives are large Steppers .

Front end is a modified Octagon LNB and current RF via an old 10W link TWT on loan from G4JNT with SMPSU mounted in the feed box .

Feed position is remote adjustable using a small linear jack with digital readout and the feed itself is a VE4MA via 90 degree twist onto the 4 port switch .

Back end systems are all HB with GPS locking to everything up and down .

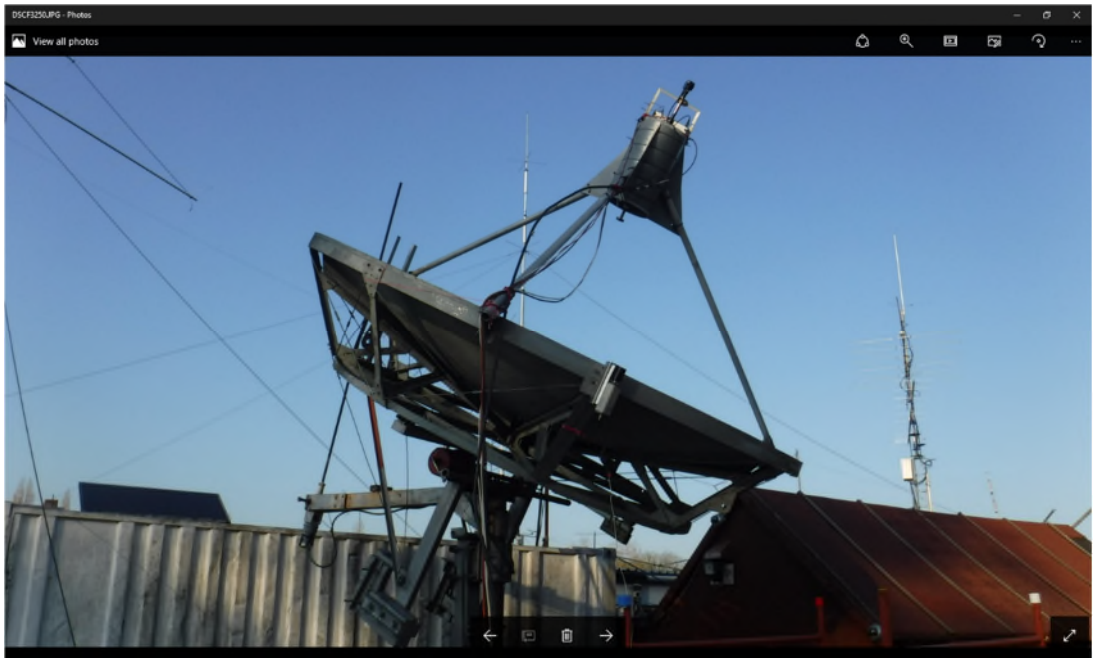
All narrow band modes are available via CAT controlled IC746 to WSJT , CW or SSB.

The required 50FT interface cables for the "large TWT "are now tested and await setup of heater , before testing starts .It is hoped to deploy on dish during this Summer and if we do not fry the front end , should be a reasonable signal .

We tested on 11/04/2019 during a high EL pass and worked OZ1FF (no final confirmation), UR5X , OK1KIR, PA0BAT(CW) , OH2DG(CW) , DL6ABC and a partial on CW with SM2SEW .Several by CQ direct and with HB9Q .

That session was almost as many stations as we worked IN Total , during 1994 .

Ops/system builders on the day, John G0API , Julian G3YGF and John M5AHV ,all members of FRARS /G4RFR .



mm-Wave Band Report

From John G0API

I took the 24GHZ sytem out for a test today and worked with Andy G4JNT/P over a semi grazing path of 75.954km .

IO80WP62RU/IO91JB01KD (above East Creech to Cheesefoot Head)

Andy was 54 on SSB(569 CW) and I was 59 with him (loud talkback via mobile phone).

We were both using Alcatel modules and 300mm ex-link dishes .

GB3SCK at 29km LOS was very LOUD - if my RX is deaf I shudder to think how the RX would cope on the direct path - beacon was audible over full 360 degrees from 650Ft asl site .

.....and finally

The deadline for activity reports to be included in the next issue is Monday 1st July 2019. John G4BAO is now coordinating activity reports. Reports should be sent to **scatterpoint@microwavers.org**

Contests

May 2019 Lowband Contest Results

This years entry level was similar to 2018. Three entries were received for 2300MHz for the first time so perhaps activity will increase on this segment from now on.

As usual the IARU region 1 contest generated good activity on the continent and resulted in some nice DX worked on 1296MHz and 2320MHz.

Leading station on 1296MHz was M3P (Mike G8CUL/Ann G8NVI) who beat M0HNA/P by just under 20% on overall score despite having fewer contacts. Best DX fell to Alwyn G8DOH with DF2VJ worked in JN39 square at 668km.

M0HNA/P won the 2300MHz section, but had M3P and G4LDR to keep them company this year.

On 2320MHz Mike/Ann at M3P came in well ahead of runner up Jon GM4JTJ who just pipped G8OHM for the runner up spot. It is very welcome to see a GM take one of the top spots in a microwave event. Best DX by a few km was between M3P and DL0LN in JO31 at 592km.

The leader on 3400MHz was M0HNA/P with nearly twice the score of runner up Gordon G3WJG who makes a first appearance on this band using SDR equipment. Ralph G4ALY in IO70 was the best DX worked by M0HNA/P at 271km.

The overall winners were the Combe Gibberlets, M0HNA/P, with leading scores on 2300MHz and 3400MHz, and a runner up position on 1296MHz. Overall runner up was Mike/Ann M3P who won 1296MHz and 2320MHz.

Certificates go to the overall Winner M0HNA/P and Runner-up M3P and to the following winners and runners up:

1296MHz M3P, M0HNA/P, G6GVI (Low Power)
2300MHz M0HNA/P, M3P
2320MHz M3P, GM4JTJ, G3WJG (Low Power)
3400MHz M0HNA/P, G3WJG

John G3XDY
UKuG Contest Manager

May 2019 Low Band Results

Overall

Pos	Callsign	1296MHz	2300MHz	2320MHz	3400MHz	Overall
1	M0HNA/P	837	1000	452	1000	3289
2	M3P	1000	450	1000	424	2874
3	G6TRM/P	391		529	346	1266
4	G8OHM	441		556		997
5	G3UVR	179		484		663
6	G3WJG			156	506	662
7	GM4JTJ			561		561
8	G4BRK			164	390	554
9	G4LDR	226		158	164	548
10	G4KIY	358				358
11	GM4BYF	197		125		322
12	G8DOH	282				282
13	G6GVI	58				58
14	GM4DIJ	0		10		10

1296MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	M3P	IO91JO	36	11482	DL2DAO	596
2	M0HNA/P	IO91RF	39	9615	GM4JTJ	617
3	G8OHM	IO92AJ	22	5065	ON4CJQ/P	499
4	G6TRM/P	JO01QD	17	4491	PA0O	429

5	G4KIY	IO92WN	19	4115	DL2DAO	533
6	G8DOH	IO92FA	15	3243	DF2VJ	668
7	G4LDR	IO91EC	13	2594	DF0MU	626
8	GM4BYF	IO85JV	6	2260	M0HNA/P	548
9	G3UVR	IO83KH	11	2054	G6TRM/P	390
10	G6GVI	IO83SN	4	661	M1CRO/P	317
11	GM4DIJ	IO85IW	0	0		0

2300MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	M0HNA/P	IO91RF	2	140	G4LDR	77
2	M3P	IO91JO	1	63	M0HNA/P	63
3	G4LDR	IO91EC	0	0		0

2320MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	M3P	IO91JO	20	5088	DL0LN	592
2	GM4JTJ	IO86RP	6	2852	M1CRO/P	588
3	G8OHM	IO92AJ	12	2829	ON4CJQ/P	499
4	G6TRM/P	JO01QD	12	2693	G3UVR	390
5	G3UVR	IO83KH	13	2462	G6TRM/P	390
6	M0HNA/P	IO91RF	15	2298	G8DMU	314
7	G4BRK	IO91HP	4	836	GM4JTJ	562
8	G4LDR	IO91EC	4	805	ON4CJQ/P	455
9	G3WJG	IO91RP	7	792	G8DMU	269
10	GM4BYF	IO85JV	4	638	M3P	495
11	GM4DIJ	IO85IW	2	50	GM4COX/P	43

3400MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	M0HNA/P	IO91RF	7	852	G4ALY	271
2	G3WJG	IO91RP	5	431	G2L	150
3	M3P	IO91JO	5	361	M1CRO/P	175
4	G4BRK	IO91HP	4	332	M1CRO/P	186
5	G6TRM/P	JO01QD	3	295	M3P	187
6	G4LDR	IO91EC	2	140	M0HNA/P	77

Low Band Championship 2019

Results after three sessions, the best three events count towards the total

Overall

Pos	Callsign	03/03/2019	07/04/2019	05/05/2019	TOTAL
1	M0HNA/P	3595	3865	3289	10749
2	G3UVR	1541	1511	663	3715
3	M0GHZ	1091	2286	0	3377
4	G4LDR	1063	1321	548	2932
5	M3P	0	0	2874	2874
6	G3UKV	828	1563	0	2391
7	G6TRM/P	0	908	1266	2174
8	G4KIY	464	283	358	1105
9	M0UGA/P	0	1000	0	1000
10	G8OHM	0	0	997	997
11	GI6ATZ	0	950	0	950
12	GM4BYF	290	327	322	939
13	G4ZTR	0	841	0	841
14	G8AIM	0	680	0	680
15	G3WJG	0	0	662	662
16	GM4JTJ	0	0	561	561
17	G4BRK	0	0	554	554
18	GM8IEM	406	0	0	406
19	G3YJR	53	302	0	355
20	GM4DIJ(/A)	103	195	10	308
21	G8DOH	0	0	282	282
22	G4BAO	0	228	0	228
23	G0LGS/P	0	209	0	209
24	G6GVI	0	38	58	96
25	G0HIK/P	63	0	0	63
26	G1DFL	0	42	0	42
27	M0KPW/P	34	0	0	34
28	M0XIG/P	0	24	0	24

1296MHz

Pos	Callsign	03/03/2019	07/04/2019	06/05/2018	TOTAL
1	M0HNA/P	1000	1000	837	2837
2	G3UVR	541	545	179	1265
3	G4KIY	464	283	358	1105
4	M0GHZ	396	622	0	1018
5	M3P	0	0	1000	1000
6	GI6ATZ	0	950	0	950
7	G4ZTR	0	841	0	841

8	G6TRM/P	0	347	391	738
9	G4LDR	253	219	226	698
10	G3UKV	288	260	0	548
11	GM4BYF	0	327	197	524
12	G8OHM	0	0	441	441
13	GM8IEM	406	0	0	406
14	G3YJR	53	302	0	355
15	GM4DIJ(/A)	103	195	0	298
16	G8DOH	0	0	282	282
17	G0LGS/P	0	209	0	209
18	G8AIM	0	164	0	164
19	G6GVI	0	38	58	96
20	G4BAO	0	85	0	85
21	G0HIK/P	63	0	0	63
22	M0KPW/P	34	0	0	34
23	M0XIG/P	0	24	0	24

2300MHz

Pos	Callsign	03/03/2019	07/04/2019	06/05/2018	TOTAL
1	M0HNA/P	1000	1000	1000	3000
2	M3P	0	0	450	450
3	G4LDR	0	307	0	307

2320MHz

Pos	Callsign	03/03/2019	07/04/2019	06/05/2018	TOTAL
1	G3UVR	1000	966	484	2450
2	M0HNA/P	595	865	452	1912
3	G4LDR	540	647	158	1345
4	G3UKV	540	712	0	1252
5	G6TRM/P	0	561	529	1090
6	M0GHZ	338	736	0	1074
7=	M0UGA/P	0	1000	0	1000
7=	M3P	0	0	1000	1000
9	GM4JTJ	0	0	561	561
10	G8OHM	0	0	556	556
11	G8AIM	0	238	0	238
12	G4BRK	0	0	164	164
13	G3WJG	0	0	156	156
14	GM4BYF	0	0	125	125
15	G0HIK/P	51	0	0	51
16	GM4DIJ	0	0	10	10

3400MHz

Pos	Callsign	03/03/2019	07/04/2019	06/05/2018	TOTAL
1	M0HNA/P	1000	1000	1000	3000
2	M0GHZ	357	928	0	1285
3	G3UKV	0	591	0	591
4	G4LDR	270	148	164	582
5	G3WJG	0	0	506	506
6	M3P	0	0	424	424
7	G4BRK	0	0	390	390
8	G6TRM/P	0	0	346	346
9	G8AIM	0	278	0	278
10	G4BAO	0	143	0	143
11	G1DFL	0	42	0	42

73
John G3XDY
UKuG Contest Manager

RAL Microwave Roundtable

Harwell Amateur Radio Society (HARS) will be hosting this year's RAL Microwave Round Table on Sunday 16th June at Chilton Village Hall, OX11 0SU, near Didcot in Oxfordshire.

It is the ideal meeting place for both experienced microwavers and those who may interested in starting on the bands 1GHz and up.

The event starts at 10am and the morning is given over to socialising, buying those essential bits from the traders that will present, setting up entries for the Construction Contest and partaking of the bacon baps and coffee that will be available.

In order to assist organisers with catering arrangements etc, all visitors are asked to pre-register below.

Event Information

The event is to be held in the CHILTON VILLAGE HALL. The village hall consists of a large hall, a small hall, a committee room and a kitchen, together with parking and a large attached recreational field. The event will open at 10am and feature:-

- Surplus and small trade stalls will be available in the Small Hall (£5 per pitch please)
- Chipbank
- Round 2 of the Microwave Round Table Construction Contest
- Afternoon Talks - for which offers are most welcome!

Refreshments and lunch

Bacon Butties will be available between 1000 and 1130. Homemade sandwiches and cake will be available for lunch. Tea, coffee and limited soft drinks will be available all day. (Any profits to Harwell Amateur Radio Society)

Timetable

1000	**Doors Open**
1030-1200	Informal socialising / bacon butties / surplus swap tables
1200-1300	**Lunch and Judging of UKuG Project Competition (Round 2)**
1300-1400	Talk-1, **Talk by G8GTZ and G4BAO - Title to be confirmed**
1400-1415	**Tea break**
1415-1500	Talk by Peter G3LTF - Why not try 6cm EME?
1500-1545	Talk-3, **TBC**
1615	**Event closes**

UKuG MICROWAVE CONTEST CALENDAR 2019

Dates, 2019	Time UTC	Contest name	Certificates
2-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
23-Jun	0900 - 1700	24/47GHz Trophy /76/122-248 GHz	
30-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
30-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
28 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
28 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
25-Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
25-Aug	0600 - 1800	4th 10GHz Contest	F, P,L
15- Sep	0900 - 1700	3rd 24GHz Contest	
15- Sep	0900 - 1700	3rd 47GHz Contest	
15- Sep	0900 – 1700	3rd 76GHz Contest	
29 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
29 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
20 -Oct	0900 - 1700	4th 24GHz Contest	
20 -Oct	0900 - 1700	4th 47GHz Contest	
20 -Oct	0900 – 1700	4th 76GHz Contest	
17 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz	F, P,L
Key:	F	Fixed / home station	
	P	Portable	
	L	Low-power (<10W on 1.3-3.4GHz, <1W on 5.7/10GHz)	

Events calendar

2019

June 16	RAL Round Table Chilton Village Hall	rally@g3pia.net
June 21-23	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
June 29/30	Finningley Round Table	www.g0ghk.com/
Sept 6-8	63.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 22	Crawley Roundtable	
Sept 27/28	National Hamfest	www.nationalhamfest.org.uk
Sept 29-Oct 4	European Microwave Week, Paris	www.eumweek.com/
October 3/5	Microwave Update, Dallas, Texas	www.microwaveupdate.org
Oct 28-Nov 22	ITU WRC-19, Sharm el-Sheikh	http://rsgb.org/wrc-19
Nov 2	Scottish Round Table	www.gmroundtable.org.uk/

2020

Aug tbc	EME 2020 Prague	
Sept 13–18	European Microwave Week, Utrecht	www.eumweek.com/
Oct 10-16	IARU-R1 General Conference, Novi Sad	

80m UK Microwavers net

Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV